

Summary Report of the Tsunami Hazard Mitigation Steering Group Meeting November 6-8, 2001 Seattle Washington

Attendees

Steering Group

Eddie Bernard - NOAA	James Godfrey (Alt) - State of California
Frank González - NOAA	Lori Dengler - State of California
James Weyman - NOAA	Brian Yanagi - State of Hawaii
Chris Jonient-Trisler - FEMA	Brian Yanagi - State of Hawaii
David Oppenheimer - USGS	Gerard Fryer (Alt) - State of Hawaii
Craig Weaver - USGS	Mark Darienzo - State of Oregon
Scott Simmons - State of Alaska	George Priest - State of Oregon
Taunnie Boothby - State of Alaska	George Crawford - State of Washington
Roger Hansen - State of Alaska	Tim Walsh - State of Washington

Guests

Tom Sokolowski - WC/ATWC

Vasily Titov - NOAA

OLD BUSINESS:

Review of action items

Action items open prior to the May 17 meeting:

1. ACTION ITEM: Final Local Tsunami Warning Systems and Procedures: Guidance for Local Officials document to be placed on the Oregon web site prior to the May 14-15, 2001 Workshop and Steering Group meeting.

ACTION: Mark Darienzo

STATUS: Document is being refined and will go up on the web. **OPEN**

2. ACTION ITEM: For FY 2001, \$2.3 million has been appropriated for the Program. There is an add-on of \$1 million for the Tsunami Warning and Environmental Observatory for Alaska (TWEAK), a letter of intent by Ray Highsmith at the University of Alaska. It was suggested that Ray Highsmith include Roger Hansen and Zygmunt Kowalik in writing the proposal for TWEAK.

ACTION: Ray Highsmith, Roger Hansen, and Zygmunt Kowalik to write a proposal for TWEAK.

STATUS: Proposal has been written and reviewed by Steering Group members. Proposal was funded with the money going to the University of Alaska Fairbanks. Some bathymetry studies were done and a physicist was hired to help with modeling. **CLOSED**

Action items from the May 17, 2001 meeting:

1. ACTION ITEM: Find out what information customers want on earthquakes to NWS and USGS Regional Networks so the MOU can be updated in light of new technology so there will be a clarification of procedures and better coordination of warnings. Dick Hagemeyer suggested the following four steps: 1) find out what the customers want 2) agree to a standard format, 3) obtain headquarters approval to place on NOAA Weather

Radio and EMWIN, and 4) determine how to get the information to those will put the messages on NOAA Weather Radio and EMWIN.

ACTION: Oppenheimer, Weyman, Hansen

STATUS: The feed from the University of Washington needs to be expanded. Reviewed text messages are to go onto EMWIN. The USGS is ready but needs a NOAA contact to proceed. Software needs to be developed. D. Oppenheimer will provide background to J. Weyman before proceeding. **OPEN**

2. ACTION ITEM: Update WC/ATWC, PTWC, and PMEL web sites showing buoy locations for better indication of events. **ACTION:** WC/ATWC, PTWC, PMEL

ACTION: WC/ATWC, PTWC, PMEL

STATUS: Completed. **CLOSED**

3. ACTION ITEM: Frank González to check on DART web site vulnerability to too many hits at one time. Cross reference with November 2001 Action Item number 6.

ACTION: Frank González

STATUS: A mirror or duplicate site needs to be established. J. Weyman and E. Bernard to work out an arrangement between NWS and NOAA. This item will be carried forward as November 2001 Action Item number 6. **OPEN**

4. ACTION ITEM: Each state is to plan their mapping strategy using either coarse grid or fine grid. The TIME Center is available to help with this process. Cross reference with November 2001 Action Item number 8.

ACTION: George Priest, Frank González to determine the grid issue

STATUS:

Technical issues related to the coarse grid modeling are twofold:

- Bathymetric and topographic data quality. The density of raw bathymetric and topographic data determines the details of the shoreline and numerical grids for the area of the inundation mapping project. Small-scale structures such as jetties, offshore reefs, even beach-breaks can affect tsunami inundation. If those features are not present in the raw data, an inundation model may produce inaccurate results, no matter how dense the

numerical grid used.

- Numerical model requirements. Any numerical model of tsunami inundation requires a certain amount of nodes per wavelength to produce accurate results. This problem has been the subject of many scientific studies. These results show that model inundation estimates compare well with observations if at least 100m grid size is used nearshore. A more coarse grid does not provide enough details of tsunami behavior near the shoreline, therefore can be used only to estimate offshore wave characteristics. The studies also suggest that it is essential to model tsunami inundation beyond the shoreline with moving boundaries--fixed boundaries yield substantially different results.

TIME Center Recommendations:

- inundation computations (moving, not solid boundaries) are essential for producing the inundation maps
- at least 150-100m cell size is required for inundation computations to produce useful guidance (regardless of bathy-topo data density)
- models with 50-30m cell size seem to capture most of the important local inundation features
- use the best resolution bathy-topo data available

F. González will chair a working group to prepare a draft of mapping certification procedures. Working group named includes: Rich Eisner, Tim Walsh, Gerard Fryer, Doug Luther, George Priest, Lori Dengler, Vasily Titov, Costas Synolakis, Elena Suleimani, and Antonio Baptista. This item will be carried forward as November 2001 Action Item number 8. **OPEN**

5. ACTION ITEM: The Subcommittee suggested that a dialog with NOS on bathymetry/coastal zone managements issues was needed.

ACTION: Eddie Bernard will contact the Acting Assistant Administrator for Ocean Services and Coastal Zone Management and initiate a dialog on this issue.

STATUS: Eddie Bernard contacted NOS and instituted a dialog. **CLOSED**

6. ACTION ITEM: States were asked for video and photos of the National Tsunami Hazard Mitigation Program in action including captions or explanations, as needed.

ACTION: states to send video and photos to Eddie Bernard NLT May 30, 2001. (Oregon to provide video clip on school evacuation)

STATUS: Videos and photos were sent for use at the August Review. **CLOSED**

7-9 ACTION ITEMS: were logistics for the August 7 Review.

ACTION: PMEL

STATUS: Completed. **CLOSED**

10. ACTION ITEM: Chris Jonientz-Trisler, Laura Kong, Frank González, Scott Simmons, David Oppenheimer, Richard Hagemeyer, Eddie Bernard, and Mike Hornick were named as the TWEAK Review Panel to review the proposal.

ACTION: TWEAK Review Panel to send their comments via e-mail to Eddie Bernard NLT May 25. A conference call with all Panel members is planned for 2 p.m. on May 30.

STATUS: The panel met and reviewed the TWEAK proposal. **CLOSED**

11. ACTION ITEM: Develop defensible matching funds divided into two categories: mapping and mitigation.

ACTION: States are to E-mail their figures to Eddie Bernard, Frank González, and Chris Jonientz-Trisler NLT May 25, 2001.

STATUS: Figures were sent and the items used at the August Review. **CLOSED**

12. ACTION ITEM: Develop procedures for use of buoy data by warning centers by July 1, 2001.

ACTION: Tom Sokolowski, Frank González, Eddie Bernard, PTWC/Chip McCreery

STATUS: Procedures have been developed. The FACTS DART interpretive aid prototype is being refined for use on the FACTS web site. SIFT is working on automated interactive algorithms for inversion modeling. **ONGOING**

13. ACTION ITEM: Produce isocrons prototype with elevations for likely events by July 1, 2001.

ACTION: Tom Sokolowski

STATUS: Isocrons have been created. **CLOSED**

Ongoing Items:

1. ACTION ITEM: There was considerable discussion on how to confirm the availability of resources after a disastrous event. The group formed an ad hoc subcommittee to formalize the next steps. The subcommittee consists of: Richard Przywarty, Frank González, Eddie Bernard, George Priest, and Costas Synolakis. Three new members were added to the subcommittee: Mike Hornick, Chris Jonientz-Trisler, and Richard Eisner. There was a discussion of what role the National Tsunami Hazard Mitigation Program Steering Group would have in tsunami disaster response. NOAA currently has no input in times of disaster. The current National Post-Storm Data Acquisition Plan provides only for data collection. Mike Hornick, FEMA Region IX proposed a 2-step action plan: 1) The Federal Response Plan needs a tsunami action plan. Mike Hornick and Chris Jonientz-Trisler and FEMA HQ need to develop this plan, and 2) the States need defined data collection activities. The subcommittee will review the NOAA Response Plan document and how it interacts with the states and report at the next meeting. Cross reference with November 2001 Action Item number 9.

ACTION: Subcommittee members named at the May 2001 meeting.

STATUS: As of the November 2001 meeting no interface with the Federal Response Plan plan had been drafted. Chris Jonientz-Trisler was tasked with writing the draft interface plan. This item will be carried forward as November 2001 Action Item number 9. **OPEN**

2. ACTION ITEM: A discussion of the question of how to report the mapping effort pointed out the difficulties of this issue and a method agreeable to all must be developed. Frank González and the States were asked to discuss and agree on the method of reporting the inundation mapping effort no later than March 2001. Cross reference with November 2001 Action Item number 7.

ACTION: Frank González and States

STATUS: Mapping reports should include inundation and evacuation, the number of map efforts, the number of communities mapped, and the population at risk. In addition: each map, brochure, etc., created must be provided in both electronic and hard copy to the TIME Center for the Mapping Archives. This item will be carried forward as November 2001 Action Item number 7. **OPEN**

Status Report of Program Elements

Develop NOAA/State Coordination and Technical Support

Chip McCreery reported the IOC/ITSU Eighteenth Session of the International Coordination Group for the Tsunami Warning System in the Pacific meeting was held in October in Cartagena, Colombia. The session focused on improvement of procedures and criteria for issuing warnings, watches, and cancellations. He reported that both the Historical Tsunami Database and the National Geophysical Data Center tsunami databases contain errors and omissions. An effort is underway to have the regional coordinator obtain missing information and to correct incorrect entries. One report at the IOC meeting showed that uniform signage and symbols are very important tools and the IOC has adopted the National Tsunami Hazard Mitigation Program (NTHMP) signs.

Dr. Bernard reported briefly on TROIKA, a proposal to expand the scope of the NTHMP approach globally.

The U.S. and Chile agree that there is a need to expand the tide gauge network along the western Chilean and Peruvian coasts. In some cases gauges are in place but the U.S. does not have access to this data.

Improve Seismic Networks

There are now 43 of the 56 CREST stations installed. Over the past 6 months the participants of the CREST project installed 20 new seismic stations. The 13 stations that remain to be installed should be completed in early 2002 as weather and schedules permit. Three Alaska seismic stations will be installed in early 2002 and should be fully operational by summer 2002.

Deploy Tsunami Detection Buoys

The surface buoys at D171, D165, D157, were each be inspected, serviced, and subsequently re-deployed for another year of service. The sixth buoy was deployed in the Equatorial Pacific in August. The new generation of buoys is very robust, returning 99% of data.

A transfer of the DART buoys to the National Data Buoy Center is underway. This process is expected to take approximately 2 years.

Produce Inundation Maps

Frank González reported on the status of mapping.

Mitigation

Discussions from the Mitigation meeting were brought forward. The major topics of discussion were actions to address Reviewer's comments and recommendations as well as plans for the next 5 years. See the [Mitigation Meeting report](#).

Alaska is planning a statewide earthquake/tsunami symposium for Alaska emergency managers in Anchorage in April 2002. Tentative dates are April 15-19. Steering Group members were cordially invited to attend.

NEW BUSINESS

Establishment of the Richard H. Hagemeyer Tsunami Mitigation Memorial Award

Dick Hagemeyer, who passed away on October 25, was a member of the National Tsunami Hazard Mitigation Program (NTHMP) Steering Committee from its inception and we all deeply feel his loss. His staunch support for tsunami mitigation was a major force in the development and success of the program. He embraced this state/federal partnership and made it stronger by instilling a sense of public service to the program. He single-handedly managed one of the five elements of the program—Improve Coordination—with no budget! He managed this by working with Warning Centers and enlisting his cadre of Warning Center Meteorologists to include tsunamis in their duties. One of his most lasting legacies was compilation and dissemination of the Historical Tsunami Data Base, making global historic tsunami information readily available to U.S. coastal emergency managers.

In honor of Dick Hagemeyer the Steering Group unanimously agreed to establish a yearly tsunami mitigation award to recognize a particularly outstanding state mitigation activity. A volunteer was solicited to draft the award criteria. Dr. Bernard prepared a letter introducing the award to the NOAA Administrator, with copies to the Assistant Administrator for Oceanic and Atmospheric Research and the Assistant Administrator for Weather Services. Each Steering Group member present at the meeting signed the letter and it was mailed on November 9.

ACTION ITEM 1: Lori Dengler volunteered to draft the criteria for the award by December 1, 2001. **OPEN**

Introduction of New Member

James Weyman, Acting Director, NWS Pacific Region, was introduced. He will be replacing Dick Hagemeyer on the Steering Group. Mr. Weyman announced that the Pacific Tsunami Warning Center will be renamed the Richard H. Hagemeyer Tsunami Warning Center. The dedication is tentatively scheduled for December 1.

Discussion of August Program Review

The August 7 Program Review consisted of reports from each of the state and Federal partners on their accomplishments of the past 5 years as well as a presentation of plans for the next 5 years. Members of Congress as well as state and local emergency planners attended the public forum and the poster session/reception. International tsunami scientists who attended the follow-on meeting of the IUGG Tsunami Commission also attended the August 7 review and poster session/reception.

The Steering Group discussed the comments made by the five reviewers and each of their recommendations for the National Tsunami Hazard Mitigation Program. The five Reviewers were Richard J. McCarthy, Executive Director, California Seismic Safety Commission; Dennis S. Miletic, Director, Natural Hazards Research and Applications Information Center, University of Colorado, Boulder; Douglas S. Luther, Professor of Oceanography, University of Hawaii; Philip L.-F. Liu, Professor, School of Civil and Environmental Engineering, Cornell University; and Hiroo Kanamori, Seismological Laboratory, California Institute of Technology, Pasadena, California.

One of the recommendations was to establish a 24-hour manned Tsunami Warning Center. There were differing opinions on this recommendation. Several issues must be addressed before a 24/7 operation could be implemented, including funding and additional manpower. It was pointed out that providing faster information increases the risk of error due to the lack of data and sufficient time to assess it. Even with a 24/7 on-site operation, states may not be able to act on the warnings quickly enough for the 24/7 operation to make a difference over the current manning. In addition, for a local tsunami in Alaska, time of the warning won't matter. The Steering Group's response to this recommendation was that the group feels the recommendation has merit but more data on user requirements is needed to determine if this recommendation is feasible. A draft of the recommendation letter to be sent to NOAA and USGS was prepared which states: "To effectively initiate state and local Emergency Management Plans, the five Pacific coastal states (Alaska, California, Hawaii, Oregon, Washington) of the National Tsunami Hazard Mitigation Program (NTHMP) require that the USGS, NOAA, and state agencies disseminate their automated, reviewed earthquake and tsunami notifications as rapidly as is scientifically and technologically possible. The NTHMP requests the USGS, NOAA, and states review data on response times and consider appropriate staffing and operational support to fulfill this requirement."

ACTION ITEM 2: The recommendation letter on Warning Center 24/7 operation drafted above is to be sent to NOAA and USGS in a timely manner.

ACTION: Bernard, Weyman, Przywarty **OPEN**

Another recommendation from the review was to request more and support applied research. The response to this recommendation was to establish a Tsunami Research and Advisory Committee (TRAC). This committee is tasked to write a report on coordinating more applied research interests and funding. The committee consists of: Frank González (Chairperson), George Priest, Roger Hansen, Craig Weaver, Chip McCreery, Tom Sokolowski, Tim Walsh, Gerard Fryer, and Lori Dengler.

ACTION ITEM 3: Write a report on research interest, ranking priorities and identifying a list of representatives at other agencies. Draft is due by January 2002 to Eric Geist, USGS. Final report due April 2002 for review by the full NTHMP Steering Group.

ACTION: Tsunami Research and Advisory Committee (TRAC)

One reviewer commented that the program is out of balance. the program's current emphasis is on detection and risk mapping but does not address the the sociological issues of dealing with the behavior of human beings. Also the program does not include anyone trained in disciplines that study human behavior. The reviewer also noted that more of a team approach is needed not just federal-state or state-local.

ACTION ITEM 4: To address this recommendation, the group plans to identify where the social science communtiy can advise the NTHMP on the usefulness of its activities.

ACTION: Chris Jonientz-Trisler and each state.

Tsunami data collected by seismic networks and the buoy system should all be provided and archived in one location where it is easily available to the scientific community. The group agreed that there should be a requirement to provide this data to a central source. Collecting post-event data is a function of the International Tsunami Information Center (ITIC).

ACTION ITEM 5: Encourage ITIC to be the archive for all tsunami event data. The Steering Group will offer cooperation and some resources.

ACTION: Bernard to write a letter to NWS/Weyman by January 1, 2002.

Program Recognition

The review will help us plan the next 5 years based on program impacts. Linking actions to impacts will keep the momentum going. Recognition awards are a tool to that will help us keep the momentum and funding going. Possibilities for program recognition and possible grants were discussed. Eddie Bernard has written a nomination for the public Service Excellence Awards which is sponsored by the Public Employees Roundtable. The award has been sent to the NOAA Assistant Administrator for OAR to review and submit on our behalf. The California Seismic Safety Commission has nominated NTHMP for the William A. Nierenberg Prize for Science in the Public Interest which carries with it a prize of \$25,000. James Weyman suggested that the Steering Group be nominated for a Department of Commerce Gold or Silver Medal. Eddie offered to nominate or help states with awards submissions.

Real-Time Web Site Vulnerability

This issue was brought forward from the previous open items (#3 above) for further discussion. The possibility of duplicate or mirror real-time web sites was discussed.

ACTION ITEM 6: Prepare an arrangement between NWS and OAR on mirror or duplicate real-time web sites.

ACTION: Weyman, Bernard

A discussion of the question of how to report the mapping effort pointed out the difficulties of this issue and a method agreeable to all must be developed. At the May 2001 meeting Frank González and the States were asked to discuss and agree on the method of reporting the inundation mapping effort no later than March 2001. The method agreed upon was that mapping reports should include inundation and evacuation, the number of map efforts, the number of communities mapped, and the population at risk. In addition: each map, brochure, etc., created must be provided in both electronic and hard copy to the TIME Center for the Mapping Archives.

ACTION ITEM 7: States to include in their Statements of Work a requirement to provide electronic and hard copies of mapping products to TIME.

ACTION: States

Mapping Quality Control and Certification

The quality of the mapping products is an important mapping issue that needs to be addressed. Cross reference with previous meeting open item #4.

ACTION ITEM 8: A working group needs to develop a draft document on mapping certification procedures by May 2002.

ACTION: F. González will chair a working group to prepare a draft of mapping certification procedures. Working group named includes: Rich Eisner, Tim Walsh, Gerard Fryer, Doug Luther, George Priest, Lori Dengler, Vasily Titov, Costas Synolakis, Elena Suleimani, and Antonio Baptista.

Response and Recovery

There is a new emphasis on promoting response and recovery. The Nisqually earthquake helped FEMA management to know of the NTHMP modeling experience. Chris Jonientz-Trisler and Michael Hornick (FEMA Regions 10 and 9 respectively) gained first-hand experience during the earthquake and response operations. To build infrastructure for Response and Recovery, one of the NTHMP Steering Group members should be an advisor for the Disaster Coordination Advisor. States should have plans in state mitigation in place prior to an event. Examples of these state plans can help build the federal response and recovery plan. Also, the NTHMP should be a clearing house for tsunami information (data collection). A Tsunami Research Institute should be pursued.

ACTION ITEM 9: Draft a Strategic Plan on how to interface with the Federal Response Plan in case of an event.

ACTION: Chris Jonientz-Trisler to draft Strategic Plan

ACTION ITEM 10: Begin interaction with National Science Foundation and NWS to draft a Tsunami Research Institute Plan and find funding sources.

ACTION: Bernard, González

TsunamiReady Update

The documentation and application for TsunamiReady are posted on the [WC/ATWC web site](#). The WC/ATWC brochure has been updated. The WC/ATWC now has a [mirror site](#).

The following communities have been certified as TsunamiReady: Ocean Shores, Washington, and Seward, Alaska. Long Beach, Washington, will be dedicated as TsunamiReady on January 10, 2002.

Communities with pending applications are: Quinault Tribal Nation, Washington; Cannon

Beach, Oregon; and Kodiak, Homer/Seldovia, Sitka, and Whittier Alaska.

U.S. Affiliated Pacific Islands (USAPI) Membership Application to join the NTHMP

Brian Yanagi presented for discussion the membership application of the USAPI. After much discussion about what specific needs the USAPI have and what manpower and infrastructure is already available/in place, the Steering Group decided to query them on their specific needs.

ACTION ITEM 11: Draft a letter to USAPI to request a specific needs assessment before membership in the NTHMP.

ACTION: Yanagi, Jonientz-Trisler

FY 2002 Budget

Statements of Work and budget requests for each state, mapping, seismic, and mitigation were discussed at length. At the present time, NOAA is under a Continuing Resolution and does not have a budget appropriation. Budgets for FY 2002 were based on the same appropriation as last year as a starting point (\$2.3 million plus a \$1 million TWEAK add-on), there was a surplus of approximately \$120,000. After a good deal of discussion, it was decided to divide this surplus 5 ways among the states and to let the states decide the best use of the additional funds. There was one unfunded activity of a possible Technology Infusion Workshop.

FY 2003 Budget

Using a draft of a budget initiative originally drafted by Dick Hagemeyer, the Steering Group worked through realistic figures to maintain the current five elements of the program as well as expand the scope of NTHMP. The proposed budget drafted for FY 2003 proposed budget needs of \$7.8 million.

ACTION ITEM 12: Bernard to e-mail to all Steering Group members the spreadsheet with FY 03 budget numbers as discussed during the meeting. Yanagi to send letters to Congressional members in Hawaii for support for the proposed FY 03 budget. States to also send letters of support to their state Congressional members.

ACTION: Bernard, Yanagi, states

2002 Meeting

Eddie Bernard proposed one meeting for next year to be held at PMEL in late October or early November. To avoid the duplicate discussions of mitigation issues, the format will be changed so that the Mitigation Meeting and Mapping Meetings would each meet for 1/2 day on Tuesday. The Steering Group would meet for one day on Wednesday. All budget and other proposals would be prepared in advance and brought to the meeting for discussion as was done this year. Additional conference calls, small group meetings, or e-mails would be used during the rest of the year to transact any business necessary. The group endorsed this plan and added that there should be an additional Mitigation meeting during the year.